REMARKS/ARGUMENTS

In view of the foregoing amendments and following remarks, favorable reconsideration of the pending claims is respectfully requested. Claims 1 – 6, 8 – 12, 14, 15, and 26 are currently pending.

Claims 1 – 6, 8 – 12, 14, and 15 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Office Action asserts that although Claim 1 mentions that the white liquor is added in context of the controller, it is not positively recited as part of the process, and therefore it is not clear when and if the white liquor is fed to the process. To further clarify the claimed invention, Claim 1 has been amended to recite the step of adding weak white liquor to the green liquor.

As suggested by the Examiner, Claim 1 has also been amended to be in Jepson format so that the Examiner can better appreciate that the claimed invention is directed to a new method of controlling the causticizing process.

Claims 1 – 6, 8 – 12, 14, 15, and 26 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of U.S. Patent No. 5,822,220 to Baines, U.S. Patent No. 5,213,663 to Musow, U.S. Patent No. 4,311,666 to Hultman, and U.S. Patent No. 4,762,590 to Engdahl.

The present invention as embodied in independent Claim 1 is directed to a method of controlling a causticizing process for producing white liquor from green liquor in which the density of the green liquor being fed to the slaker is controlled to a set value that is calculated based on the total titratable alkali (TTA) in the green liquor, the target value for the TTA, and a model that relates green liquor density to the measured TTA in the green liquor. The invention also includes a method for controlling a slaker within a causticizing process in which the desired density of the green liquor inlet stream is determined using a specific mathematical formula that relates density to the total titratable alkali of the green liquor; an offset, which is determined using a model having as parameters the green liquor TTA and momentary density of green liquor; and a constant angular coefficient (kk) having a value of which is between 0.9 and 1.4 when the unit used for expressing the TTA and the density is the same.

.

The combination of the cited references fails to disclose or suggest the step of calculating a set-value for the green liquor density to be introduced into the slaker based on the measured TTA of the green liquor, a target value for the TTA, and a model that relates the measured TTA in the green liquor to the green liquor density. Claim 1 recites that the step of specifying the set value for the green liquor includes the step of determining a target value for the TTA, measuring the TTA in the green liquor, providing a model that relates green liquor density to the measured TTA, and calculating the set value based on the measured TTA, target value for the TTA, and the model. None of the cited references teach a process of controlling the causticization reaction that includes the steps.

Musow teaches controlling the causticization reaction by maintaining the concentration of the sodium carbonate at a desired level. Musow does not teach the step of determining a set value for the density, let-alone the step of calculating the set-value using a target TTA, the measured TTA, and a model that relates the measured TTA to density of the green liquor.

Baines also fails to teach these steps. Baines is directed to a method of controlling the causticizing process by controlling the amount of lime that is introduced into the slaker. See column 5, lines 50-51. For example, Baines states that the "introduction of lime, CaO, to the slaker is the critical point of control." See column 5, lines 48-49. Thus, Baines uses a completely different process than the claimed process. Further, Baines teaches that the amount of lime that is to be added to the slaker may be determined by measuring concentrations of the primary constituents of the green liquor and the white liquor: carbonate, hydroxide, and sulfide. According to Baines, these components are individually measured to provide the control system with a complete characterization of the reagents participating in the causticizing reaction so that each individual component may be accounted for by the control system. See column 3, lines 9-15. Thus, Baines also fails to disclose or suggest the step of determining a set value for the density, let-alone the step of calculating the set-value using a target TTA, the measured TTA, and a model that relates the measured TTA to density of the green liquor.

Hultman and Engdahl also fail to disclose or suggest the process recited in Claims and 26. Hultman, as in Baines, is directed to a process in which the causticization process is controlled by controlling the amount of calcium oxide (lime) that is added to the slaker. In particular, Hultman teaches that in order to better control the causticization process, variations in

the quality of the lime being fed into the slaker must be accounted for so that adjustments to the quanitity of lime be fed to the slaker can be made. Hultman accomplishes this by estimating the flow of carbonate ion per unit time in both the green and white liquors. See column 4, lines 25 – 40. From this information, "the flow of calcium oxide per unit time can be proportioned in accordance with the flow of carbonate ion in the green and white liquor." See Id. Thus, according to the process described in Hultman "one determines the carbonate ion concentration of the starting green liquor, and the carbonate ion content of the causticized white liquor, and then controls the addition of calcium oxide to the green liquor accordingly to maintain the degree of causticization within a predetermined range." See column 3, lines 7 – 28 (emphasis added). Thus, as in Baines, Hultman is directed to a completely different process of controlling the causticization process than the claimed invention.

The Office Action alleges that "Hultman teaches the measurement of green density and control of white infeed." However, the Office Action does not even attempt to indicate where support for such a statement can be found in Hultman. If the Examiner wishes to maintain this rejection, it is respectfully requested that the Examiner point to the specific passages in Hultman in which such an alleged teaching can be found. However, for the sake of argument, even if the alleged teaching could be found in Hultman, Hultman still fails to disclose or suggest a process in which the amount of white liquor added to the green liquor is determined by based on the measured TTA of the green liquor, a target value for the TTA, and a model that relates the measured TTA in the green liquor to the green liquor density. Accordingly, Hultman also fails to disclose or suggest the claimed invention.

Contrary to the assertions in the Office Action, Engdahl does not describe a process in which white liquor is added to the green liquor. Rather, Engdahl describes a process in which white liquor itself is slaked with the lime to produce a combination of slaked lime and white liquor. It is to this combination to which the green liquor is added. In a subsequent step, the white liquor containing the slaked lime is mixed with green liquor and sent to a tank where causticization of the slaked lime occurs. See column 2, line 55 –column 3, line 25. The resulting white liquor (i.e., the original white liquor and that which is a product of the reaction between the slaked lime and the green liquor) is separated into a stream to be used in the Kraft process and a stream that is to be used in the lime slaking process discussed above. Thus, it can

be clearly seen that the process describe in Engdahl is completely different than the claimed process, and therefore Engdahl does not disclose or suggest the claimed invention.

Further, Engdahl does not disclose or suggest controlling the density of the green liquor being added to the slaker, or any desirability of doing so. In fact, there would be no motivation to do so because in the process of Engdahl, the white liquor already contains the slaked lime prior to the introduction of the green liquor. Since Engdahl does not disclose or suggest controlling the density of the green liquor, it certainly does not disclose a process in which the amount of white liquor added to the green liquor is determined by based on the measured TTA of the green liquor, a target value for the TTA, and a model that relates the measured TTA in the green liquor to the green liquor density. In fact, Engdahl is completely silent with respect to measuring parameters, such TTA, density, and the like. Accordingly, Engdahl also fails to disclose or suggest the claimed invention.

From the above discussion, it is evident that none of Musow, Baines, Hultman, or Engdahl describe 1) a process in which white liquor is used to control the density of the green liquor being fed to the slaker, or 2) a process in which the amount of white liquor added to the green liquor is determined by based on the measured TTA of the green liquor, a target value for the TTA, and a model that relates the measured TTA in the green liquor to the green liquor density. Since none of the cited references disclose or suggest these elements of Claim 1, the combination of the references certainly cannot disclose or suggest them. It is therefore respectfully submitted that Claim 1 and any claims dependent thereon are patentable over the cited references, whether considered individually or in combination.

With respect to Claim 26, it can be seen from the above discussion that the cited references also fail to disclose or suggest the process recited in Clam 26, or the mathematical formula implemented by the process. The Office Action fails to show where such a process can be found in the references, or where a process utilizing the recited mathematical formula is found in the references. In the rejection, the Office Action relies on vague statements that the workings of how the computer makes calculations are known and therefore it would be obvious to use the equation recited in Claim 11. However, such statements cannot support an obviousness rejection. If such an assertion were true, it is a wonder that any additional patents utilizing mathematical equations and

computers could ever be obtained. Accordingly, Claim 26 is also patentable over the combination of references.

There is no Motivation to Combine the teachings of Baines with Musow, Hultman, or Engdahl

Applicants respectfully submit that one of ordinary skill in the art would have no motivation to combine Baines and Musow in the manner contemplated by the Examiner. Specifically, neither Baines nor Musow provide the motivation to combine the computer process of Baines with variable measurements described in Musow.

First, the methods described in Musow and Baines are completely different from each other. Baines teaches controlling the amount of lime added to the slaker, whereas Musow teaches maintaining the sodium carbonate concentration at a desired concentration by adjusting the amount of weak wash solution that is added to the dissolving tank. These steps utilize different methods and different chemical reactions for controlling the causticizing reaction, and occur at completely separated points in the Kraft process. As such, one of ordinary skill in the art would not be motivated to select disparate and unrelated elements from Baines to be combined with unconnected elements of Musow.

As noted above, Musow teaches regulating the sodium carbonate concentration of a green liquor in a dissolving tank by measuring conductivity of the green liquor in the dissolving tank. See e.g., column 2, lines 44 – 47. In particular, Musow teaches calculating the concentration of a single component, e.g., utilizing conductivity measurements, to maintain a desired level of sodium carbonate within the green liquor.

In sharp contrast, Baines includes multiple statements that teach away from using measurements, such as conductivity, in controlling the causticizing reaction. First, Baines repeatedly emphasizes that using a single characteristic, such Na_2CO_3 concentration, conductivity, TTA, or density, in controlling the causticization reaction provides less accuracy and therefore is undesirable. For example, Baines states that "a measurement of a single characteristic of the entire white or green liquor, as taught by Bertelsen, can result in error...." See column 2, lines 27-29. Baines further elaborates that "Bertelsen teaches that the progress of the causticizing reaction can be measured by making a differential conductivity measurement." See column 2, lines 17 – 19. From these excerpts, it can be seen that Baines clearly teaches

away from the process described in Musow, and away from using measurements, such as TTA or density, as recited in the claimed process. Baines further states at column 6, lines 10 – 14 that [r]ather it is the determination of the relative concentrations of the liquor components, as opposed to a measurement of a characteristic of the total liquor that is important to the methods of the present invention." Thus, the teachings of Baines include numerous statements that would teach away from the combination of Baines and Musow.

Hultman and Engdahl also fail to provide the necessary motivation to combine the references. Engdahl is completely silent with respect to measurements, such as density, TTA, and the like. Hultman describes measuring carbonate ion concentration of the starting green liquor, and the carbonate ion content of the causticized white liquor to determine how much lime is to be added to the slaker. As discussed above, Baines teaches against using such measurements. In fact, Baines specifically teaches the undesirability of the method described in Hultman. For example, Baines states that the "the Hultman method measures only a sample of the liquor. The measurement is relatively complex in that it involves introducing an additional reaction to create a by-product, CO_2, that can be measured. The measurement of CO_2 is not directly related to the causticizing reaction and is therefore only an inferred measurement." See column 2, lines 8 – 14. Thus, Baines clearly teaches away from the process described in Hultman and one of ordinary skill in the art would not be motivated to modify the process of Baines to include measuring single components of the green and white liquors as taught in Hultman.

It is clear that Baines goes to great extent to distance the process described therein from the teachings of Musow and Hultman, which utilize a single measurement, such as conductivity or carbonate ion concentration, to control the causticization process. In light of this clear teaching away from Musow and Hultman, there would be no motivation to combine the teachings of Baines with either Musow or Hultman in the manner contemplated by the Examiner.

Further, Musow also teaches away from the claimed invention. Specifically, Musow states that conductivity measurements are superior and more accurate than indirect measurements such as TTA measurements of the green liquor. For example, Musow states "[t]he above-described method regulates sodium carbonate concentration based on measurements that are more accurate than such indirect measures as density of the green liquor

or total titratable alkali in the green liquor." See e.g., column 2, lines 58 – 63. By teaching that TTA measurements are inferior, Musow teaches away from using TTA measurements of a green liquor for control purposes, and one of ordinary skill in the art would not be motivated to combine the conductivity measurements, or even TTA measurements, of Musow with a control system such as the Baines system. Thus, one of ordinary skill in the art would not be motivated to combine Baines and Musow.
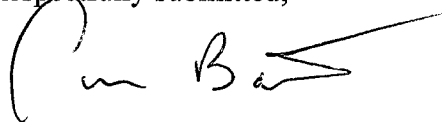
In maintaining the rejections, the Examiner has repeatedly ignored the multiple teachings in both Baines and Musow that teach away from the claimed invention and teach away from the combination of Baines and Musow. Therefore, it is respectfully requested that the rejections of the claims based on the combination of Baines, Musow, Hultman, and Engdahl be withdrawn.

In view of the foregoing amendments and remarks, it is respectfully requested that the rejections under 35 U.S.C. § 103(a) and 112 have been overcome, and that the pending claims are in condition for allowance.

Conclusion

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

Timothy J. Balts
Registration No. 51,429

Customer No. 00826
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111
LEGAL01/13059133v1

ELECTRONICALLY FILED USING THE EFS-WEB
ELECTRONIC FILING SYSTEM OF THE UNITED STATES
PATENT & TRADEMARK OFFICE ON August 24, 2007.